SURGEX®

The most trusted name in **power protection.™**

SU-1500-DC

USER MANUAL

UPS OPERATION

Ver 1.0 - Rev. A

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1 INTRODUCTION

Thank you for purchasing this power protection product. It has been designed and manufactured to provide many years of trouble free service.

IMPORTANT SAFETY INSTRUCTIONS
SAVE THESE INSTRUCTIONS !

Please read this manual before installing your UPS, as it provides important information that should be followed during installation and maintenance of the UPS and batteries allowing you to correctly set up your system for the maximum safety and performance. Included is information on customer support and factory service if it is required. If you experience a problem with the UPS please refer to the Troubleshooting guide in this manual to correct the UPS please refer to the Troubleshooting guide in this manual to correct the problem or collect enough information so that the Technical Support Department can rapidly assist you.

This symbol indicates "ATTENTION"

This symbol indicates "Risk of Electrical Shock"

This symbol indicates "Alternating Current Supply Phase"

This symbol indicates "Alternating Current Supply"

This symbol indicates "Direct Current Supply"

This symbol indicates "Equipment Grounding Conductor"

CAUTION! Connect the UPS to a two pole, three wire grounding AC wall outlet. The receptacle must be connected to the appropriate branch protection (circuit breaker or fuse). Connection to any other type of receptacle may result in a shock hazard and violate local electrical codes. Do not use extension cords, adapter plugs, or surge strips.

CAUTION! To reduce the risk of electrical shock with the installation of this UPS equipment and the connected equipment, the user must ensure that the combined sum of the AC leakage current does not exceed 3.5mA.

CAUTION! To reduce the risk of electrical shock in conditions where the load equipment grounding cannot be verified, disconnect the UPS from the AC wall outlet before installing a computer interface cable. Reconnect the power cord only after all signaling connections are made.

WARNING: This Uninterruptible Power Supply contains potentially hazardous voltages. Do not attempt to disassemble the UPS beyond the battery replacement procedure. This UPS contains no user serviceable parts. Repairs and Battery replacement must be performed by **QUALIFIED SERVICE PERSONNEL ONLY.**

WARNING: Risk of Electrical Shock. Hazardous live parts inside these power supplies are energized from the battery even when the AC input is disconnected.

CAUTION! To de-energize the outputs of the UPS:

1. If the UPS is on press and release the Off button.
2. Disconnect the UPS from the AC wall outlet.
3. To de-energize the UPS completely, disconnect the battery.

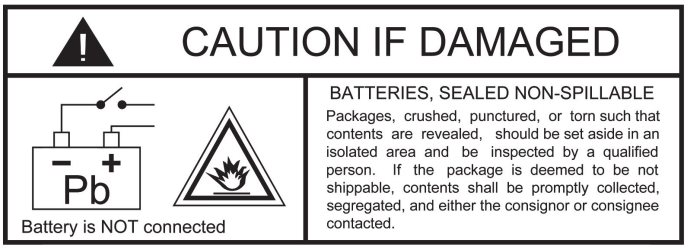
NOTICE: This equipment has been tested and found to comply with the limits for a Class A and/or Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules and the Class A and/or Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference of the Canadian Department of Communications. These limits are designed to provide reasonable protection against such interference in a residential installation. This equipment generates and uses radio frequency and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, this equipment may cause interference to radio and television reception. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient the receiving antenna.
- Relocate the computer with respect to the receiver.
- Move the computer away from the receiver.
- Plug the computer into a different outlet so that the computer and receiver are on different branch circuits.
- Shielded communications interface cables must be used with this product.

WARNING: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Receiving Inspection

After removing your UPS from its carton, it should be inspected for damage that may have occurred in shipping. Immediately notify the carrier and place of purchase if any damage is found. Warranty claims for damage caused by the carrier will not be honored. The packing materials that your UPS was shipped in are carefully designed to minimize any shipping damage. In the unlikely case that the UPS needs to be returned to the manufacturer, please use the original packing material. Since the manufacturer is not responsible for shipping damage incurred when the system is returned, the original packing material is inexpensive insurance. **PLEASE SAVE THE PACKING MATERIALS!**


CAUTION IF DAMAGED
Pb
Battery is NOT connected
BATTERIES, SEALED NON-SPILLABLE
Packages, crushed, punctured, or torn such that contents are revealed, should be set aside in an isolated area and be inspected by a qualified person. If the package is deemed to be not shippable, contents shall be promptly collected, segregated, and either the consignor or consignee contacted.

NOTE: These UPSs are shipped with the batteries disconnected. The batteries must be connected before putting these UPSs into service. Refer to Section 3 "Installation" for connecting the batteries.

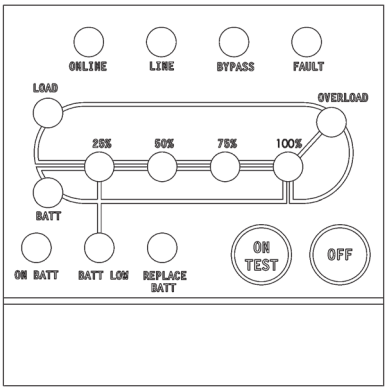
Life Support Policy

As a general policy, we do not recommend the use of any of our products in life support applications where failure or malfunction of the product can be reasonably expected to cause failure of the life support device or to significantly affect its safety or effectiveness. We do not recommend the use of any of our products in direct patient care. We will not knowingly sell our products for use in such applications unless it receives in writing assurances satisfactory to us that (a) the risks of injury or damage have been minimized, (b) the customer assumes all such risks, and (c) our liability is adequately protected under the circumstances.

Examples of devices considered to be life support devices are neonatal oxygen analyzers, nerve stimulators (whether used for anesthesia, pain relief, or other purposes), auto transfusion devices, blood pumps, defibrillators, arrhythmia detectors and alarms, pacemakers, hemodialysis systems, peritoneal dialysis systems, neonatal ventilator incubators, ventilators for both adults and infants, anesthesia ventilators, and infusion pumps as well as any other devices designated as “critical” by the United States FDA.

2 CONTROLS AND INDICATORS

CONTROL PANEL



The ONLINE (green) LED illuminates in a steady state when the UPS is on and the inverter is providing the output power. The ONLINE LED will extinguish when operating in the Battery mode.

The LINE (green) LED illuminates in a steady state when the UPS is connected to Utility Power and there is an acceptable AC voltage present. The LINE LED will extinguish when operating in the Battery mode and if the Utility voltage is not present. The LINE LED will flash when the Utility voltage or frequency is out of the Bypass mode range.

The BYPASS (yellow) LED will be flashing when the UPS is operating in the Bypass mode. The BYPASS LED will extinguish when operating in the On-Line and the Battery modes.

The FAULT (red) LED illuminates in a steady state when the UPS detects an internal fault and is not functioning properly. The FAULT LED is extinguished when the UPS is operating properly.

The LOAD (yellow) LED illuminates is a steady state when the UPS is operating in the On-line or Bypass modes. The LOAD LED indicates the Battery/Load Capacity bar graph (4-LEDs) represents the output load capacity. The LOAD LED will extinguish in the Battery mode.

The OVERLOAD (red) LED illuminates in a steady state when the output load has exceeded the full load rating of the UPS. The OVERLOAD LED will extinguish when the output load has not exceeded the full load rating of the UPS.

The BATT (yellow) LED illuminates is a steady state when the UPS is operating in the Battery mode. The BATT LED indicates the Battery/Load Capacity bar graph (4-LEDs) represents the battery capacity. The BATT LED will extinguish in the On-Line and the Bypass modes.

The ON BATT (green) LED illuminates in a steady state when the UPS is operating in the Battery mode. The ON BATT LED will extinguish when operating in the On-Line and the Bypass modes.

The BATT LOW (yellow) LED illuminates in a steady state when the UPS reaches a low battery condition. The BATT LOW LED is extinguished when the UPS is in the On-Line mode and when the battery is not in a low battery condition.

The REPLACE BATT (red) LED illuminates in a steady state when the UPS detects a weak battery, bad battery or if the battery is disconnected. The REPLACE BATT LED is extinguished when the battery's condition is good.

The Load Level Bar Graph operates as follows:
25% Load (green) LED will be illuminated when there is approximately 25% of the rated capacity.
50% Load (green) LED will be illuminated when there is approximately 50% of the rated capacity.
75% Load (green) LED will be illuminated when there is approximately 75% of the rated capacity.
100% Load (green) LED will be illuminated when there is approximately 100% of the rated capacity.

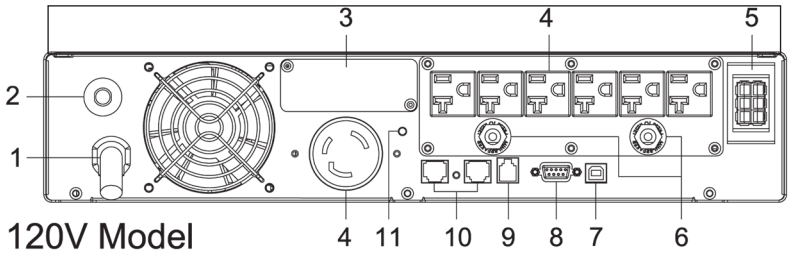
The Battery Capacity Bar Graph operates as follows:
100% Battery Capacity (green) LED will be illuminated until the battery's capacity drops below 100% capacity and then it will extinguish.
75% Battery Capacity (green) LED will be illuminated until the battery's capacity drops below 75% capacity and then it will extinguish.
50% Battery Capacity (green) LED will be illuminated until the battery's capacity drops below 50% capacity and then it will extinguish.
25% Battery Capacity (green) LED will be illuminated until the battery's capacity drops below 25% capacity and then it will extinguish.

When the following events occurred, the corresponding LEDs will illuminate as followings:
Battery Test: All of the LEDs will be constantly on.
EPO function: All of the LEDs will be off.
Output short circuit: The OVERLOAD LED will flash.

ON/TEST Button has three functions:
1. Press for 1-beep (2-seconds) to turn the UPS on.
2. AC mode: Press for 1-beep (2-seconds) to perform a battery test.
3. Battery mode: Press for 1-beep (2-seconds) to silence the alarm.

OFF Button:
Press for 1-beep (2-seconds) to turn the UPS off.

REAR PANEL



1. The input power cord (120V models).
2. The input circuit breaker will trip in the event the load exceeds the UPS's power rating.
3. The option slot is for option cards.
4. The Battery Backup output power receptacles. The output receptacles are electrically wired into two segments to support the "Load Shedding Function". The locking receptacle does not support the Load Shedding Function. **NOTE:** The locking recptacle is not on all models.
5. The External Battery Connector is for connecting External Battery Packs.
6. The output circuit breaker will trip in the event the load exceeds the UPS's power rating.
7. The USB Communications Interface Port is for UPS monitoring and control.
8. RS232 Communications Interface Port is for UPS monitoring and control.
9. The RJ11 REPO (Remote Emergency Power Off) Port is for UPS control.
10. The R-J11/R-J45 modular connectors are used for 10/100 Base-T Network/single line Phone/Fax/Modem protection.
11. External Ground Stud for connecting an external ground wire.

Input Power Plug (All power cords are 10ft)	Output Power Receptacles
NEMA 5-15P	6-NEMA 5-15R

3 INSTALLATION

INSTALLATION PLACEMENT

This UPS series is intended to be install in a temperature controlled environment that is free of conductive contaminants. Select a location which will provide good air circulation for the UPS at all times. Avoid locations near heating devices, water or excessive humidity, or where the UPS is exposed to direct sunlight. Route power cords so they cannot be walked on or damaged.
Operating Temperature (Maximum): 0 to 40 degrees C (+32 to +104 degrees F)
Operating Elevation: 0 to 3,000m (0 to +10,000 ft)
Operating and Storage Relative Humidity: 95%, non-condensing
Storage Temperature: -15 to +45 degrees C (+5 to +113 degrees F)
Storage Elevation: 0 to 15,000m (0 to +50,000 ft)

INSTALLATION

Be sure to read the installation placement and all the cautions before installing the UPS. Place the UPS in the final desired location and complete the rest of the installation procedure. These UPSs are shipped with the internal batteries disconnected. The batteries must be connected before putting these UPSs into service. Follow the procedure below to connect the batteries and install the UPS into the rack. **USE CAUTION:** The UPS is heavy. Use the appropriate number of personnel when installing the UPS.

CONNECTING THE BATTERIES

(QUALIFIED SERVICE PERSONNEL ONLY)
Please read all of the **WARNINGS** and **CAUTIONS** before attempting to connect the batteries.

1. Remove the UPS from the shipping box and set on the floor or a bench top.
2. Remove the front panel retaining screws.
3. Lay the front panel on top of the UPS.
4. Verify proper polarity. Connect the battery connectors (red and black) together.

NOTE: Some sparking might occur, this is normal.

5. Re-install the front panel onto the UPS.
6. Re-install the front panel retaining screws.
7. Continue with the rest of the Installation.

RACKMOUNT CONFIGURATION

The UPS comes with mounting brackets for the standard 19" (46.5cm) rack. The mounting brackets to fit a 23" (59.2cm) standard rack are also available. The screws for mounting the UPS to the rack are not included (screw size varies with rack size).

1. Locate the mounting bracket screw holes on the side panels of the UPS, at the front of the UPS. **NOTE:** The mounting brackets can also be mounted in the middle of the UPS.
2. Align the mounting bracket with the mounting bracket screw holes.
3. Attach the mounting bracket with the retaining screws.
4. Mount the UPS into the rack and secure with the retaining screws. **WARNING:** Use two or more people when installing the UPS. Use **CAUTION**, the UPS is extremely heavy. Do not move the rack after the units have been installed. The rack maybe unstable due to the weight distribution.
5. The Rackmount Configuration is complete. See Connecting your Equipment.

CONNECTING YOUR EQUIPMENT

Plug the equipment into the output receptacles on the rear panel of the UPS. Do not use extension cords, adapter plugs or surge strips on the output of the UPS. Ensure that you do not exceed the maximum output rating of the UPS (refer to the information label on the UPS or the Electrical Specifications in this manual).

CAUTION! **DO NOT** connect a laser printer to the output receptacles on the UPS, unless the UPS is rated 2000VA or greater. A laser printer draws significantly more power when printing than at idle and may overload the UPS.

CONNECTING THE UPS TO AN AC SOURCE

Plug the UPS into a two pole, three wire, grounded receptacle only. Do not use extension cords, adapter plugs, or surge strips.

CHARGING THE BATTERY

The UPS will charge the internal batteries whenever the UPS is connected to an AC source and there is an acceptable AC voltage present. It is recommended that the UPS's batteries be charged for a minimum of 4 hours before use. The UPS may be used immediately, however, the “On-Battery” runtime-may be less than normally expected. NOTE: If the UPS is going to be out of service or stored for a prolonged period of time, the batteries must be recharged for at least twenty-four hours every ninety days.

COMMUNICATIONS PORT CONNECTION (OPTIONAL)

The Power Monitoring Software and interface cables can be used with the UPS. Use only the interface cables that come with these UPSs. Connect the interface cable (Serial or USB) to the appropriate communications port on the rear panel of the UPS. Connect the other end of the cable to the device that will be monitoring/controlling the UPS. **NOTE:** Connecting to the Communications Port is optional. The UPS works properly without this connection.

NETWORK/PHONE/FAX/MODEM PROTECTION CONNECTION (OPTIONAL)

Connect a 10/100 Base-T network, single line phone, Fax or Modem line to the RJ11/45 protection sockets on the rear panel of the UPS. This connection will require another length of telephone or network cable. The cable coming from the telephone service or networked system is connected to the port marked “IN”. The equipment to be protected is connected to the port marked "OUT". **NOTE:** Connecting to the Network/Phone/Fax/Modem protection socket connection is optional. The UPS works properly without this connection.

RJ11 REPO (Remote Emergency Power Off) PORT (OPTIONAL)

Connect one end of the RJ11 cable to the REPO port and the other end of the RJ11 cable to the EPO switch. In the AC or the Battery mode short pin4 to pin5 for approximately 0.5-seconds to shutdown the UPS. The UPS must be turned off and then back on again to restart the UPS. **NOTE:** Connecting to the REPO port is optional. The UPS works properly without this connection.

4 OPERATION

SYSTEM OVERVIEW

This On-Line UPS protects computers, servers, internetworking, and telecommunications equipment from blackouts, brownouts, overvoltages, and surges. This On-Line UPS converts the input AC to DC and then back to a True Sine Wave AC output. The True Sine Wave output is regulated within 2% of the nominal output voltage. The Power Factor Correction (PFC) circuitry corrects the input power factor to within 97% of unity and blocks the load generated harmonic distortion from getting back on the input AC line. This On-Line UPS provides a continuous true sine wave output with zero transfer time and great regulation to protect your mission critical equipment. The UPS will quietly and confidently protect your system from power anomalies.

The UPS will charge the batteries with the UPS in the on or off position as long as the UPS is plugged into the AC wall outlet and there is an acceptable AC voltage present (80/90 - 138VAC). When a blackout, brownout, or an overvoltage condition occurs; the UPS will transfer to the battery mode, the On-Battery indicator will illuminate and the audible alarm will sound once every ten-seconds indicating that the commercial power is lost or unacceptable. When the commercial power returns or is at an acceptable level, the UPS will automatically transfer back to the normal On-Line mode and start recharging the batteries. During an extended outage when there is approximately two-minutes of backup time remaining the audible alarm will sound twice every five-seconds. This Low Battery Warning is letting the user know that they should save all open files and turn off their computer. When the batteries reach the predetermined level the UPS will automatically shutdown protecting the batteries from over discharging. Once the commercial power returns the UPS will automatically restart, providing safe usable power to the connected equipment and start recharging the batteries.

ON / Test Button

Press the ON/Test Button for 1-beep (2-seconds) to turn the UPS on and supply power to the load. In the AC mode press the ON/Test Button for 1-beep (2-seconds) to perform a battery test. In the Battery mode press the ON/Test Button for 1-beep (2-seconds) to silence the audible alarm. The UPS will continue to charge the batteries whenever it is plugged into a wall outlet and there is acceptable AC voltage present.

OFF Button
Press the OFF button for 1-beep (2-seconds) to turn the UPS off.

SELF TEST
The self test feature is useful to verify the correct operation of the UPS and the condition of the batteries. With the UPS in the AC normal mode, press the ON/ Test/Alarm Silencer Button for 1-beep (2-seconds) to perform a battery test. The UPS will perform a ten-second self test. During the self test, the UPS will switch to battery power and the ON BATT LED will illuminate and the audible alarm will sound. If the UPS fails a self test, one of the LEDs will remain illuminated indicating the type of problem.

OUTPUT VOLTAGE SETTINGS
The inverter output voltage setting may be changed by the user to set the desired Inverter output voltage. The inverter output voltage setting can be either 120VAC default or 110VAC. The inverter output voltage can be changed by using the Output voltage setting software. The software program is available for download on the web site.

LOAD SHEDDING FUNCTION
The output receptacles are electrically wired into two segments to support the "Load Shedding Function". The user can control the two segments individually or both at the same time. The Load Shedding Function is controllable by the Power Monitoring Software or the SNMP card.

COMMUNICATIONS PORTS (RS232 and USB)
The RS232 communication port is a standard DB9 female with both RS232 and simulated contact closure capability. The UPS will poll the port and activate the port for RS232 or contact closure in accordance with the type of cable it finds connected to the port. To change the port configuration requires the unit be turned off and restarted with the desired cable connected. The pinout for the port is depicted per the chart below:
Pin 1: Simulated contact closure Low Battery Warning, NO
Pin 2: /TXD
Pin 3: /RXD and receive UPS shutdown command (connect to pin9 for 4-seconds. The shutdown command is only active in the battery mode)
Pin 4: Not Used
Pin 5: Ground
Pin 6: Not Used
Pin 7: Not Used
Pin 8: Simulated contact closure AC fail, NO
Pin 9: Atx Signal (high level: 12V ± 2V, low level: -15V ± -2V)

USB PORT
The USB protocol is HID. The HID USB driver is standard in the Windows OS. Simply plug the USB cable into the UPS and the computer then follow the prompts on the screen.

RJ11 REPO (Remote Emergency Power Off) PORT

In the AC or the Battery mode short pin4 to pin5 for approximately 0.5-seconds to shutdown the UPS. The UPS must be turned off and then back on again to restart the UPS.

POWER MONITORING SOFTWARE

The UPS comes with a Power Monitoring Software CD. See the software CD for the installation of the Power Monitoring Software.

OPTION SLOT

The option slot on the rear panel of the UPS is for option cards. Contact your local dealer for the available option cards.

ALARMS

ON-BATTERY

When the UPS is operating on the batteries, the ON BATT LED will illuminate and the audible alarm will sound once every ten-seconds. The alarm will stop once the UPS returns to the AC normal mode.

LOW BATTERY WARNING

When the batteries reach the pre-determined level the BATT LOW LED will illuminate and the audible alarm will sound two beeps every five-seconds. This condition will continue until AC returns or the UPS shuts down from battery exhaustion.

WEAK/BAD BATTERY

The UPS automatically tests the battery's condition and will illuminate the REPLACE BATT LED and sound the alarm. This alarm will be repeated until the batteries pass a self test. If the battery is weak or bad, the REPLACE BATT LED will illuminate and the alarm will beep three times every five-minutes until the battery is replaced. It is recommended that the UPS be allowed to charge overnight before performing a battery test to confirm a Weak/Bad Battery condition.

NOTE: If the UPS has a REPLACE BATT Alarm after reconnecting or replacing the batteries, the user must initiate a self test to clear the REPLACE BATT Alarm. To initiate a self test see section 4 "**SELF TEST**".

OVERLOAD

When the amount of load attached to the UPS exceeds its power rating, the OVERLOAD LED will illuminate and the UPS will sound a constant alarm. This alarm will remain on until the excess load is removed or the UPS's self protection circuit shuts the UPS down.

UPS FAULT

When the UPS detects a hardware fault, the FAULT LED will illuminate and the UPS will sound a constant alarm. The fault condition, in some instances, may be reset by turning the UPS off and then on again.

5 TROUBLESHOOTING

Symptom	Possible Cause	What To Do
UPS will not turn on	On/Off/Test button not pushed	Press and release the On/Off/ Test button to start UPS
UPS operates in battery mode only, even though there is normal AC present	Input AC circuit breaker is tripped	Reset circuit breaker by pressing the plunger back in. If the AC circuit breaker trips after UPS starts up, reduce the load on the UPS
Fault LED is illuminated	UPS has detected an internal fault	Call for service
The On-Line LED is illuminated, but there is no output	The UPS is being controlled via its communications port	Disconnect the computer cable from the UPS and press the On button. If UPS works normally, the software has control of the UPS
UPS does not provide the expected runtime	The batteries may be weak or at the end of useful service life	Charge the batteries for 8 hours and retest. -If the runtime is still less than expected, the batteries may need to be replaced, even though the Weak/Bad Battery LED is not illuminated
Weak/Bad Battery LED is illuminated	Loose connections at the batteries, Weak batteries, Bad batteries	Check battery connections, charge the batteries for 8-hours and then retest, replace the batteries
Overload LED is illuminated and a constant alarm	The load has exceeded the UPS's capacity	Check the specifications (see section 8). Remove part of the load
The On-Line LED is illuminated and Load Segment 1 has an output, but there is no output from Load Segment 2	The output breaker for Load Segment 2 is tripped, Load Segment 2 was turned off by the software or the SNMP card	Reset the output breaker for Load Segment 2, turn on Load Segment 2 by the software or the SNMP card

6 REPLACING THE BATTERY

REPLACING THE BATTERY

(QUALIFIED SERVICE PERSONNEL ONLY)

The UPS has an easy to replace hot-swappable batteries. Please read all of the **WARNINGS** and **CAUTIONS** before attempting to service the batteries.

NOTE: If there is a power interruption while replacing the hot-swappable batteries, with the UPS on, the load will not be backed up.

WARNING! This Uninterruptible Power Supply contains potentially hazardous voltages. Do not attempt to disassemble the UPS beyond the battery replacement procedure. This UPS contains no user serviceable parts. Repairs and Battery replacement must be performed by **QUALIFIED SERVICE PERSONNEL ONLY.**

CAUTION: Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes and may be toxic.

CAUTION: Do not dispose of batteries in a fire. The batteries may explode. The batteries in this UPS are recyclable. Dispose of the batteries properly. The batteries contain lead and pose a hazard to the environment and human health if not disposed of properly. Refer to local codes for proper disposal requirements or return the battery to the supplier.

CAUTION: Although battery system voltage is only 48VDC, the battery system can still present a risk of electrical shock. This battery produces sufficient current to burn wire or tools very rapidly, producing molten metal. Observe these precautions when replacing the battery:

1. Remove watches, rings, or other metal objects.
2. Use hand tools with insulated handles.
3. Wear protective eye gear (goggles), rubber gloves and boots.
4. Do not lay tools or other metal parts on top of batteries.
5. Disconnect the charging source prior to connecting or disconnecting the battery terminals.
6. Determine if the battery is inadvertently grounded. If the battery is, remove the source of the grounding. Contact with any part of a grounded battery can result in an electrical shock. The likelihood of such shock will be reduced, if such grounds are removed during installation and maintenance.

CAUTION: Replace batteries with the same number and type as originally installed in the UPS. These batteries have pressure operated vents. These UPSs contain sealed non-spillable maintenance-free lead acid batteries.

Battery Qty/Rating	4-12V7.2Ah
CSB Part #	GP 1272 F2
Panasonic Part #	LC-R127.2
Yuasa Part #	NP-7.2-12

BATTERY REPLACEMENT PROCEDURE

PLEASE READ THE CAUTIONS AND WARNINGS BEFORE ATTEMPTING TO REPLACE THE BATTERIES

Hot-swappable batteries mean that the batteries can be replaced without powering down the whole UPS system.

NOTE: If there is a power interruption while replacing the hot-swappable batteries, with the UPS on, the load will not be backed up. To hot-swap the batteries start with step number 6.

1. Turn off the equipment that is plugged into the output receptacles of the UPS.
2. Press the OFF button to turn the UPS off.
3. Unplug the UPS's AC power cord from the AC wall outlet.
4. Unplug the equipment from the output receptacles of the UPS.
5. Unplug the computer interface cable from the rear panel of the UPS.
6. Remove the front panel retaining screws. (FIG. 2)
7. Lay the front panel on top of the UPS.

8. Remove the two retaining screws for the battery retaining bracket. (FIG. 3)
9. Remove the battery retaining bracket. (FIG. 3)
10. Disconnect the Battery connectors (red and black). (FIG. 4)
11. Grasp the battery pull tab and gently pull the battery module out of the UPS and set on the floor. (FIG. 4)

NOTE: Use Caution, the battery module is heavy.

12. Disconnect the battery positive (red) wire.
13. Disconnect the battery negative (black) wire.
14. Remove the battery jumper wires.
15. Remove the old batteries from the battery module.
16. Install the new batteries into the battery module in the same position as the original batteries.
17. Verify proper polarity. Re-install the battery jumper wires on the new batteries.
18. Verify proper polarity. Reconnect the battery negative (black) wire.
19. Verify proper polarity. Reconnect the battery positive (red) wire.
20. Slide the battery module into the UPS.
21. Verify proper polarity. Reconnect the battery connectors (red and black).

NOTE: Some sparking might occur, this is normal.

22. Re-install the battery retaining bracket.
23. Re-install the two retaining screws for the battery retaining bracket.
24. Re-install the front panel on the UPS.
25. Re-install the front panel retaining screws.
26. Properly dispose of the old batteries at an appropriate recycling facility or return them to the supplier in the packing material for the new batteries.
27. The UPS is now ready for the normal operation.

NOTE: If the UPS has a Weak/Bad Battery Alarm after replacing the batteries, the user must initiate a self test to clear the Weak/Bad Battery Alarm. To initiate a self test see section 4 "**SELF TEST**".

7 OBTAINING SERVICE

IF THE UPS REQUIRES SERVICE

1. Use the **TROUBLESHOOTING** section to eliminate obvious causes.
2. Verify there are no circuit breakers tripped. A tripped circuit breaker is the most common problem.
3. Call your dealer for assistance. If you cannot reach your dealer, or if they cannot resolve the problem call or fax the Technical Support department at 1-800-645-9721. Please have the following information available BEFORE calling the Technical Support Department

   A. Your name and address.
   B. Where and when the unit was purchased.
   C. All of the model information about your UPS.
   D. Any information on the failure, including LEDs that may be illuminated.
   E. A description of the protected equipment, including model numbers if possible.
   F. A technician will ask you for the above information and, if possible, help solve your problem over the phone. In the event that the unit requires factory service, the technician will issue you a Return Material Authorization Number (RMA #).
   G. If the UPS is under warranty, the repairs will be done at no charge. If not, there will be a charge for repair.
4. Pack the UPS in its original packaging. If the original packaging is no longer available, ask the Technical Support Technician about obtaining a new set. It is important to pack the UPS properly in order to avoid damage in transit. Never use Styrofoam beads for a packing material.
   A. Include a letter with your name, address, day time phone number, RMA number, a copy of your original sales receipt, and a brief description of the problem.
5. Mark the RMA # on the outside of all packages. The factory cannot accept any package without the RMA # marked on the outside.
6. Return the UPS by insured, prepaid carrier to:

SurgeX
517 North Industrial Dr.
Zebulon, NC 27597

8 SPECIFICATIONS

SYSTEM SPECIFICATIONS	
Topology	Double Conversion On-Line, True Sine Wave
Maximum Power Capacity	1500VA/1200W
INPUT	
Number of Phase	(Single 1∅ 2W +G)
Nominal Voltage	120VAC
Acceptable Input voltage	0 - 150VAC
Voltage Range	90 - 138VAC
Power Factor Correction	≥97% at Full Load
Frequency Limits	50 or 60 Hz, +/-6Hz, autosensing
Low Voltage Transfer Point	80/90V resets to Utility Power at 86/96V or higher
High Voltage Transfer Point	138V resets to Utility Power at 132V or lower
Input Protection	Resettable Circuit Breaker
OUTPUT ON-LINE OPERATION	
Voltage Range	120VAC: 117.6 - 122.4VAC
Voltage Regulation	Nominal +/-2%
Frequency Range	60Hz: 54 - 66Hz or 50Hz: 44 - 56Hz
Efficiency (Line Mode)	>87% (Full Load)
OUTPUT BATTERY OPERATION	
Waveform Type	True Sine Wave
Nominal Voltage	Default: 120VAC, User selectable: 110VAC
Voltage Regulation	Nominal +/-2% (until Low Battery Warning)
Frequency	50/60Hz, +/-0.1Hz (unless synchronized to utility)
Voltage T.H.D.	≤3% (Linear Load)
Dynamic Response	+/-5% @ 100% Load change in 30 ms
Transfer Time	0 ms
Slew Rate	≤1Hz / second
Crest Factor	3 : 1
Overload Capacity	≥115% - ≤125% for 60-seconds ≥125% - ≤150% for 30-seconds >150% for 1-second
Protection	Over-Current, Short-Circuit Protected and Latching Shutdown

BATTERY SYSTEM	
Battery Type	Sealed, Non-Spillable, Maintenance Free, Value Regulated Lead Acid
Typical Recharge Time	8-hours from total discharge
Typical Battery Life	3-5 years, depending on discharge cycles and ambient temp
System Voltage	48VDC
Battery: Quantity/Rating	4-12V7.2Ah
Runtime: Half Load (minutes)	13
Runtime: Full Load (minutes)	4
SURGE PROTECTION AND FILTERING	
Max. Applied Surge Energy	Unlimited*
Max. Applied Surge Current	Unlimited* * 1.2 x 50 microsecond industry standard combination wave surge as per IEEE C62.41
Surge Let-through Voltage (6000 Volt surge)	0 Volts (Zero let-through Voltage for a 6000 V surge)
10/100 Base-T surge protection let-through (as a percentage of an applied +/-6 kV 1.2/50 us, 500 a 8/20 uS test)	<5%
Telephone line surge protection let-through (as a percentage of an applied +/-6 kV 1.2/50 us, 500a 8/20 uS test)	<1%
Noise Filter	normal and common mode EMI/RFI suppression
Audible Noise at 1 m (3 ft.)	<45 dBA
ENVIRONMENTAL	
Operating Temperature (max)	0 to 40°C (+32 to +104°F)
Storage Temperature	-15 to +45°C (+5 to +113°F)
Operating/Storage Humidity	95% Non-Condensing
Operating Elevation	0 to 3,000m (0 to +10,000 ft)
Storage Elevation	0 to 15,000m (0 to +50,000 ft)
PHYSICAL	
Size - Net H X W X D	5.25" x 17.3" x 17.0" 13.3 x 43.9 x 43.2 cm
Weight - Net	55 lbs 25.0 Kgs
Size - Shipping H X W X D	11.8125" x 24.875" x 23.75" 300 x 632 x 603 mm
Weight - Shipping	55.0 lbs 25.0 Kgs
REGULATORY COMPLIANCE	
Safety and Approvals	UL1778, cUL (CSA 22.2 no.107.1) / UL1449 3rd Ed. PENDING
EMC Verification	FCC, CE certified

9 CONFIGURABLE PARAMETERS AND SETTINGS

(These items may require optional software or hardware)

Function	Factory Default	User Choices	Description
UPS ID	Endeavor Series	Up to 64 characters to define the UPS	Use this function to uniquely identify the UPS in your network configuration
Battery install date	Date of manufacture	Date of battery replacement - month/day/year XX/XX/XXXX	Enter the current date when replacing batteries
Battery life in days	1826	Up to 5 characters	At first battery replacement, reset to reflect actual number of days experience in your environment or leave factory default
Enable/ Disable auto restart	Enabled	Enable or Disable	When enabled, the UPS will automatically restart from a low battery shutdown when normal AC returns
Set audible alarm state	Enabled	Enabled, at low battery, disabled	Enabled - the UPS will emit a short beep when in the battery mode. At Low Battery the UPS will emit two beeps from low battery warning until shutdown. Disabled - Use only when software is controlling the UPS or to silence the alarm
Shut-down Type	Entire UPS	Entire UPS or UPS output	Entire UPS - Turns off the entire UPS. UPS Output - Turns off the UPS's output receptacles only.
Set inverter output voltage	120VAC	110, 115, 120VAC	Changes output voltage for battery mode operation
Enable/ Disable REPO	Disabled	Enable or Disable	Enabled - the UPS will be completely powered off and remain off until the UPS is reset

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11-YEAR
INDUSTRY LEADING
WARRANTY

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NOTE: 2 YEAR WARRANTY ON UPS BATTERIES.

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